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1. India joins Artemis agreement (June 23, 2023)

India-joins-Artemis-agreement

India joins NASA's Artemis agreement for collaborative lunar exploration.

An Overview of the News

- Prime Minister Narendra Modi signed the agreement during his state visit to the United States.
- The focus is on **returning humans to the Moon and expanding space exploration to Mars and beyond.**
- **The Artemis agreements are based on the 1967 United Nations Outer Space Treaty.**
- It is a **non-binding multilateral arrangement** between the **US government and the participating countries.**
- The US-led initiative aims to land **humans on the Moon by 2025.**
- As of **June 22, 2023, 26 countries and one territory** have signed the agreement.

About NASA (National Aeronautics and Space Administration)

- It is a **government agency of the United States of America.**
- This agency is responsible for **science and technology related to air and space.**
- The Space Age began in **1957** with the launch of the **Soviet satellite Sputnik.**
- **NASA was established in 1958** to consolidate and coordinate American efforts in space exploration and technology development.

Founder - **Dwight D. Eisenhower**

Headquarters - **Washington, D.C., United States**

2. For the first time, US regulators approved the sale of chicken made from animal cells (June 22, 2023)

US-regulators-approved-the-sale-of-chicken-made-from-animal-cells
The US regulators on 21st June have granted approval for the sale of chicken made from animal cells, making it the first time such products will be available to consumers.

An overview of the news

- Two California-based companies, Upside Foods and Good Meat, have received the green light from the Department of Agriculture to offer "cell-cultured" meat, which is produced in laboratories rather than derived from slaughtered animals.

Benefits of Cultivated Meat

- The approval of lab-grown meat marks a new era in meat production aimed at addressing concerns related to animal welfare and environmental impact.
- This has the potential to significantly reduce animal harm and environmental degradation.

Federal Inspections and Safety

- Both Upside Foods and Good Meat have obtained the approvals for federal inspections required to sell meat and poultry in the US.
- Prior to this, the US Food and Drug Administration (FDA) had declared the products from these companies as safe for consumption.
- Joinn Biologics, a manufacturing company associated with Good Meat, has also been cleared to produce the cultured meat products.

Process of Lab grown meat

- Cultivated meat is grown in steel tanks using cells derived from **living animals, fertilized eggs, or stored cell banks.**
- Upside Foods produces large sheets of meat that are then shaped into **chicken cutlets and sausages.**
- **Good Meat,** which already sells cultivated meat in Singapore, creates various products such as cutlets, nuggets, shredded meat, and satays from chicken cells.
- The production of cultured meat begins with the **selection of cells from live animals** or commercially available cell lines.
- These cells are combined with a **nutrient-rich mixture** in a cultivator, where they grow rapidly.

3. Integrated Simulator Complex 'Dhruv' inaugurated by Defense Minister Rajnath Singh (June 21, 2023)

Integrated-Simulator-Complex-'Dhruv'-inaugurated-by-Defense-Minister-Rajnath-Singh
Defense Minister Rajnath Singh inaugurated the **Integrated Simulator Complex (ISC) 'Dhruv'** at the **Southern Naval Command, Kochi on June 21, 2023.**

An Overview of the News

- ISC 'DHRUV' **hosts state-of-the-art indigenously built simulators.**
- Simulators greatly enhance practical training in the Indian Navy.
- The simulators provide **real-time experience on navigation, fleet operations and naval tactics.**

- Simulators will be used for training personnel from friendly countries.

Visiting Simulators

- Raksha Mantri visited the **Multi-Station Handling Simulator (MSSHS), Air Direction and Helicopter Control Simulator (ADHCS) and Astronavigation Dome, envisaged at the Integrated Simulator Complex.**
- Ship handling simulators manufactured by **ARI Pvt Ltd, New Delhi, exported to 18 countries.**
- The **Astronavigation Dome** developed by **Infovision Technologies Pvt Ltd is the first of its kind in the Indian Navy.**
- ADHCS, developed by the Institute for Systems Studies and Analysis, provides real-time operational environment scenarios.

Significance and Export Potential

- These simulators are indicative of the '**Atmanirbhar Bharat' initiative.**
- The simulator has great potential for defence exports.
- Other indigenously developed simulators in the complex include **Combat Management System and Maritime Domain Awareness Lab.**

4. ‘Agni Prime’ ballistic missile successfully flight-tested by DRDO (June 8, 2023)

Agni-Prime New Generation Ballistic Missile **‘Agni Prime**’ was successfully flight-tested by **Defence Research and Development Organisation (DRDO**) from **Dr APJ Abdul Kalam Island** off the coast of Odisha on June 7, 2023.

An overview of the news

- DRDO's successful test flight of 'Agni Prime' missile marks a **significant achievement.**
- This was the first pre-induction night launch by the users after three successful developmental trials of the missile, **validating the accuracy and reliability of the system.**
- Range instrumentation such as **radar, telemetry and electro optical tracking systems** were deployed at various locations including two down-range vessels at the terminal point to capture flight data covering the entire trajectory of the vehicle.

About 'Agni Prime' Missile

- The missile is a **two-stage canisterised missile.**

- It is the latest and sixth variant of the Agni series missiles, developed under the **Integrated Guided Missile Development Program (IGMDP).**
- The missile is equipped with multiple independently targetable re-entry vehicles, enabling it to deliver warheads to separate locations. It has a **range of 1,000 - 2,000 km.**
- The missile has a **diameter of 1.2 m and a height of 10.5 m.**
- It has a payload capacity of up to **1.5 tonnes for carrying warheads.**
- The missile is capable of performing high maneuvers while homing in on its targets.
- After a series of user-associated launches, these missiles will be officially **inducted into the armed forces.**

5. Indian Navy undertakes first combat firing of Varunastra torpedo (June 8, 2023)

The **Indian Navy and the country's Defence Research and Development Organisation (DRDO**) undertook the **first 'combat' test-firing of the Varunastra** heavyweight torpedo on 5 June.

An overview of the news

- It will enhance the **anti-submarine warfare capabilities** of the indigenous Navy and give it a formidable force.
- The torpedo was fired from a submarine and successfully hit the target at a **distance of 40 km.**
- The test was conducted in the **Arabian Sea** in the presence of senior officials from the Indian Navy and the Defense Research and Development Organization (DRDO).

About Varunastra torpedo

- It has been designed and developed by the **Naval Science and Technological Laboratory at Visakhapatnam** under the Defense Research and Development Organisation.
- **Bharat Dynamics Limited (BDL)** is responsible for the **production of the Varunastra missile system.**
- This would become the mainstay of **anti-submarine torpedoes for all Navy warships.**
- It will **replace the old torpedoes** on all naval ships that can fire heavy-weight torpedoes.

Features of the Varunastra

- It is **seven to eight meters long**, **weighs 1,500 kg** and has a **diameter of 533 mm.**
- When fired it can travel at **40 knots, or 74 kmph**.
- The **operational range is 40 km** and it can carry a warhead weighing 250 kg.
- Varunastra was inducted by Indian Navy **in 2016**
- It can be fired from all **Anti-submarine warfare (ASW**) ships capable of firing heavy-weight torpedoes in an intense countermeasures environment.

Benefits of the Varunastra Torpedo

- It is a powerful and sophisticated weapon that will significantly enhance the **Navy's ability to detect, track, and engage enemy submarines.**
- It is the first indigenously developed heavyweight torpedo that is capable of meeting the Navy's operational requirements.
- This will reduce the Navy's dependence on foreign weapons systems.
- It is a cost-effective weapon that will save the Navy money in the long run.

6. What is train 'Kavach' and why is it trending after the Odisha train accident? (June 6, 2023)

Kavach initiative

The **Odisha triple-train accident**, which resulted in 290 deaths and 1,175 injuries, brought into focus the **Kavach initiative** that aims to make the Indian Railways safer.

An overview of the news

- The Kavach system has **not yet started on the Odisha route.**
- Railways confirmed that no 'Kavach' system has been installed in the trains to prevent them from colliding with each other.
- The government is being severely criticized for neglecting railway safety.

Coverage of Kavach

- To prevent incidents of accidents, the government announced **in 2022** that it would launch a new avatar of Kavach on a trial basis, initially covering a **distance of 2,000 kilometers** and then expanding the coverage further.
- **Only 1,455 km of railway routes** under South Central Railway have been brought under **Kavach by January 2023.**
- The government plans to expand it from **4,000 to 5,000 km in FY24.**

- For reference, Indian Railways has a total route coverage of around **1.03 lakh km.**
- A little over **1% of the route of the Indian Railways is protected by Kavach as of now.**

What is Kavach?

- Kavach is an **indigenous Automatic Train Protection (ATP) system.**
- It was developed by the **Research Designs and Standards Organisation (RDSO)**, an Indian Railways department, way back in **2002.**
- The Kavach system is designed to **prevent collisions of trains** – a leading cause of railway accidents in India.
- It is a set of **electronic devices and Radio Frequency Identification (RFID) devices** installed in locomotives, in the signalling system as well as the tracks.
- They communicate with each other using **ultra high radio frequency** to control the brakes of the trains and also alert the drivers.
- While there have been **58 railway accidents in the last 10 years**, the Odisha accident is the deadliest.
- This protection system is aimed at avoiding accidents arising out of driver-related or technical errors, as well as aid drivers (loco pilots) in running the trains safely even in inclement weather conditions.
- It activates the train braking system automatically if the driver fails to control the train as per the speed restrictions.

7. South Korea launches first commercial-grade satellite (June 1, 2023)

South Korea to launch its first commercial-grade satellite on May 25, 2023.

An Overview of the News

- The **commercial-grade satellite** was launched by the **Naro Space Center in Gohang, South Korea**, using a Launch **Nuri rocket.**
- The main satellite, called "**Next Generation Small Satellite 2"**, was accompanied by seven cube-shaped satellites.
- The main satellite objectives include verifying **imaging radar technology and observing cosmic radiation** in near-Earth orbit.
- South Korea's Science Minister Lee confirmed the successful launch of all seven secondary satellites from the rocket.
- South Korea plans to launch **three more Nuri rockets by 2027.**
- In the past year, South Korea became the **10th country to send a satellite into space** using its technology, with a "**performance verification satellite"** launched via a Nuri rocket.

South Korea

- It is an **East Asian nation** located in the **southern part of the Korean Peninsula.**
- It shares a heavily militarised border with North Korea.
- President - **Yoon Suk Yeol**
- Capital - **Seoul**
- Prime minister - **Han Duck-soo**

8. South Korea offers KSS-III batch-II submarine to India (June 1, 2023)

Recently **South Korea** has made an exclusive offer to provide its advanced **KSS-III Batch-II submarines to India.**

An overview of the news

- The proposal comes at a time when Germany is about to complete India's submarine acquisition programme, **Project 75I.**

About KSS-III Batch-II submarine

- The KSS-III is the largest submarine to ever be built by South Korea, is being developed in two phases, **Batch-I and Batch-II.**
- It is part of the Korean Attack Submarine program and represents a significant advancement in the country's naval capabilities.
- The KSS-III Batch-II submarine is an advanced version of its predecessor submarine in terms of **combat management system, firepower and sonar capabilities.**
- It is jointly developed by **Daewoo Shipbuilding and Marine Engineering (DSME) and Hyundai Heavy Industries (HHI).**
- The KSS-III submarine is a series of **diesel-electric attack submarines.**

Features of KSS-III batch-II submarine

- It is equipped with advanced technologies and facilities to enhance **operational effectiveness.**
- The submarine has a **length of approximately 84 m (275 ft)** and a s**ubmerged displacement** of approximately **3,000 tonnes.**
- The KSS-III Batch-II submarine utilizes a combination of **air-independent propulsion (AIP) system** and diesel-electric propulsion.
- The submarine is capable of reaching **speeds of over 20 knots (37 kilometers per hour)** while submerged.

- The submarine is equipped with a **range of armaments and sensors** to fulfill its mission requirements.
- It includes **torpedoes** for anti-submarine warfare, **anti-ship missiles** for surface engagement, and **land-attack capabilities.**
- The submarine also features **advanced sensor systems**, such as **sonar and radar,** to detect and track underwater and surface targets.
- The KSS-III Batch-II submarine has a crew capacity of around **50 personnel.**

Export Potential

- South Korea aims to promote the KSS-III Batch-II submarine for potential export to other countries.
- The advanced features, operational capabilities, and competitive pricing make it an attractive option for nations seeking to modernize their naval forces.

9. China launches 3 astronauts to Tiangong space station (May 30, 2023)

China-launches-3-astronauts-to-Tiangong-space-station
In China, three astronauts, including a civilian, were launched to the **Tiangong Space Station on Shenzhou-16** on 30 May.

An overview of the news

- The civilian, **Professor Gui Haichao of Beihang University**, was the first to be placed in orbit in space.
- This is the first mission for **Shenzhou-16 Tiangong** since it entered the application and development phase.
- Tiangong is the crown jewel of China's space program, which has also landed **robotic rovers on Mars and the Moon**. The launch was a complete success and the astronauts are in good condition.
- The Shenzhou-16 crew was launched aboard a **Long March 2F rocket** at 9:31 a.m. local time from the **Jiuquan Satellite Launch Center in northwest China.**
- China's first manned space mission in 2003 made it the **third country after the Soviet Union and the United States** to send a man into space from its own resources.

10. XPoSat (May 30, 2023)

XPoSat
The **X-ray Polarimeter Satellite (XPoSat) mission** is a collaborative effort between the **Indian Space Research Organization (ISRO) and the Raman Research Institute (RRI) in Bengaluru.**

An Overview of the News

- XPoSat aims to develop and launch the **X-ray Polarimeter Satellite (XPoSat)** later this year.
- XPoSat aims to study the polarisation of X-rays emitted by celestial sources.
- The study of X-ray polarisation can provide valuable insight into the nature and behaviour of astrophysical sources such as n**eutron stars, black holes and active galactic nuclei.**
- XPoSat is **India's first and world's second polarimetry mission**.
- NASA's Imaging X-ray Polarimetry Explorer (IXPE), the only other major mission of its kind, is slated to launch in 2021.

About ISRO

- It is the **national space agency** of India. It launches its space rocket from **Satish Dhawan Space Center in Sriharikota, Andhra** Pradesh.
- Establishment - **15 August 1969**
- Founder - **Vikram Sarabhai**
- Headquarters - **Bengaluru**
- Chairman - **S Somnath**